Area Between Curves

p. 390 - 393 (7.2) # 69

If f and g are continuous on [a,b] and $g(x) \le f(x)$ bounded by vertical lines $x = a$ and $x = b$, then the area is found by

$$A = \int_a^b (f(x) - g(x))\, dx.$$

To find the area of a region:
1. Sketch or draw graphs.
2. Determine whether *dx* or *dy*.
3. Find the limits from the boundaries, axes, or intersections.
4. Set up the integral by Top - Bottom if *dx* or Right - Left if *dy*.
5. Integrate and evaluate the integral.

**1. Find the area of the region in the first quadrant that is enclosed by the graphs of $y = x^3 + 8$ and $y = x + 8$.

**2. The area of the region bounded by the lines $x = 0$, $x = 2$, and $y = 0$ and the curve $y = e^{x/2}$ is ____.

**(calc.) FR 3. Find the area of R, the region in the first quadrant enclosed by the graphs of $f(x) = 1 + \sin(2x)$ and $g(x) = e^{x/2}$.